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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,704	11/13/2001	McDonald Robinson	Lawrence 712	8430

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Robert Moll  
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EXAMINER

SUTTON, TIMOTHY J

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 08/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/010,704

Applicant(s)

ROBINSON ET AL.

Examiner

Timothy J Sutton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 May 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 49-67 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 50, 52-54, 56, 58-61, 63, and 65-67 is/are rejected.
- 7) ☒ Claim(s) 49, 51, 55, 57, 62, and 64 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 2-20 have been renumbered 49-67, in Pre-Amendment B, in Paper No. 3.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 50, 52, and 53 are rejected under 35 U.S.C. 102(e) as being anticipated by Bassous et al. (U.S. 5,357,899).

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Re claim 1, Bassous et al. discloses growing one or more epitaxial layers on a silicon crystal substrate (column 5, lines 55-56), at least one of which is a Si-Ge-C layer, wherein the carbon of the Si-Ge-C layer is an amount sufficient to exhibit etch selectivity with respect to the single crystal silicon substrate and/or one or more of the epitaxial layers adjacent the Si-Ge-C layer (column 3, lines 1-20); and etching the Si-Ge-C layer, and the single crystal silicon substrate and/or one or more of the epitaxial layers adjacent the Si-Ge-C layer (column 5, lines 55-65).

Re claim 50, the Si-Ge-C layer (14) etches slower than the single crystal silicon substrate (10) in Figure 1C.

Re claim 52, the Si-Ge-C layer (12) etches faster than the single crystal substrate (10) in Figure 1B.

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Re claim 53, the etching includes applying KOH (column 5, lines 55-65).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 54, 56, and 58-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bassous et al. (U.S. 5,357,899) in view of Furukawa et al. (U.S. 4,885,614).

Re claim 54, Bassous et al. discloses growing one or more epitaxial layers sequentially, starting at the single crystal substrate surface (column 5, lines 55-56),

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wherein at least one of the epitaxial layers comprise Si-Ge-C, (column 3, lines 1-20) and etching the Si-Ge-C layer, and the single crystal substrate and/or one or more of the epitaxial layers adjacent the Si-Ge-C layer (column 5, lines 55-65).

Re claim 56, the Si-Ge-C layer (14) etches slower than the single crystal silicon substrate (10) in Figure 1C.

Re claim 58, the Si-Ge-C layer (12) etches faster than the single crystal substrate (10) in Figure 1B.

Re claim 59, the single crystal substrate is made of silicon (column 5, lines 60-5).

Re claim 60, the etching includes applying KOH (column 5, lines 55-65).

Bassous et al. fails to teach that the carbon layer is up to 5 atomic percent (claim 54).

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Furukawa et al. teaches a carbon between 1 and 10 percent (figure 1 and 2).

Furukawa et al. teaches that the preferred ratio between germanium and carbon is 9:1 for the least atomic mismatch with silicon (columns 3-4, lines 60-8). Furukawa et al. teaches multiple possible ratios between germanium and silicon which contain a germanium to carbon ration of 9:1. As can be easily ascertained, germanium to carbon ratio of 9:1, the content of carbon will range from 0-10% dependent on the amount of germanium.

It would have been obvious to one with ordinary skill in the art to use 1-10% carbon as taught in Furukawa et al. in the invention of Bassous et al. because the lattice mismatch with silicon is least in this range.

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5. Claims 61, 63, and 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bassous et al. (U.S. 5,357,899) in view of Furukawa et al. (U.S. 4,885,614).

Re claim 61, Bassous et al. discloses growing one or more epitaxial layers sequentially, starting at the substrate (column 5, lines 55-56), wherein at least one of the layers comprise Si-Ge-C, (column 3, lines 1-20) and etching the Si-Ge-C layer, and one or more layers adjacent to the Si-Ge-C layer and/or the substrate (column 5, lines 55-65).

Re claim 63, the Si-Ge-C layer (14) etches slower than the substrate (10) in Figure 1C.

Re claim 65, the Si-Ge-C layer (12) etches faster than the substrate (10) in Figure 1B.

Re claim 66, the single crystal substrate is made of silicon (column 5, lines 60-5).

Re claim 67, the etching includes applying KOH (column 5, lines 55-65).

Bassous et al. fails to teach that the carbon layer is up to 10 atomic percent (claim 61).

Furukawa et al. teaches a carbon between 1 and 10 percent (figure 1 and 2). Furukawa et al. teaches that the preferred ratio between germanium and carbon is 9:1 for the least atomic mismatch with silicon (columns 3-4, lines 60-8). Furukawa et al. teaches multiple possible ratios between germanium and silicon, which contain a germanium to carbon ration of 9:1. As can be easily ascertained, germanium to carbon

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ratio of 9:1, the content of carbon will range from 0-10% dependent on the amount of germanium.

It would have been obvious to one with ordinary skill in the art to use 1-10% carbon as taught in Furukawa et al. in the invention of Bassous et al. because the lattice mismatch with silicon is least in this range.

### ***Allowable Subject Matter***

Claims 49, 51, 55, 57, 62 and 64 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not teach or fairly suggest in combination with the other claimed limitations that the Si-Ge-C layer etches slower than the one or more adjacent epitaxial layers (claim 49); the Si-Ge-C etches faster than the one or more adjacent epitaxial layers (claim 51); the Si-Ge-C layer etches slower than the one or more adjacent epitaxial layers (claim 55); the Si-Ge-C etches faster than the one or more adjacent epitaxial layers (claim 57); the Si-Ge-C layer etches slower than the one or more adjacent layers (claim 62); the Si-Ge-C etches faster than the one or more adjacent layers (claim 64).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J Sutton whose telephone number is 703-305-0070. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

tjs  
August 22, 2002

*C. Chaudhari*  
Chandra Chaudhari  
Primary Examiner

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